



User Requirements Gathered for the NERSC 7 Procurement

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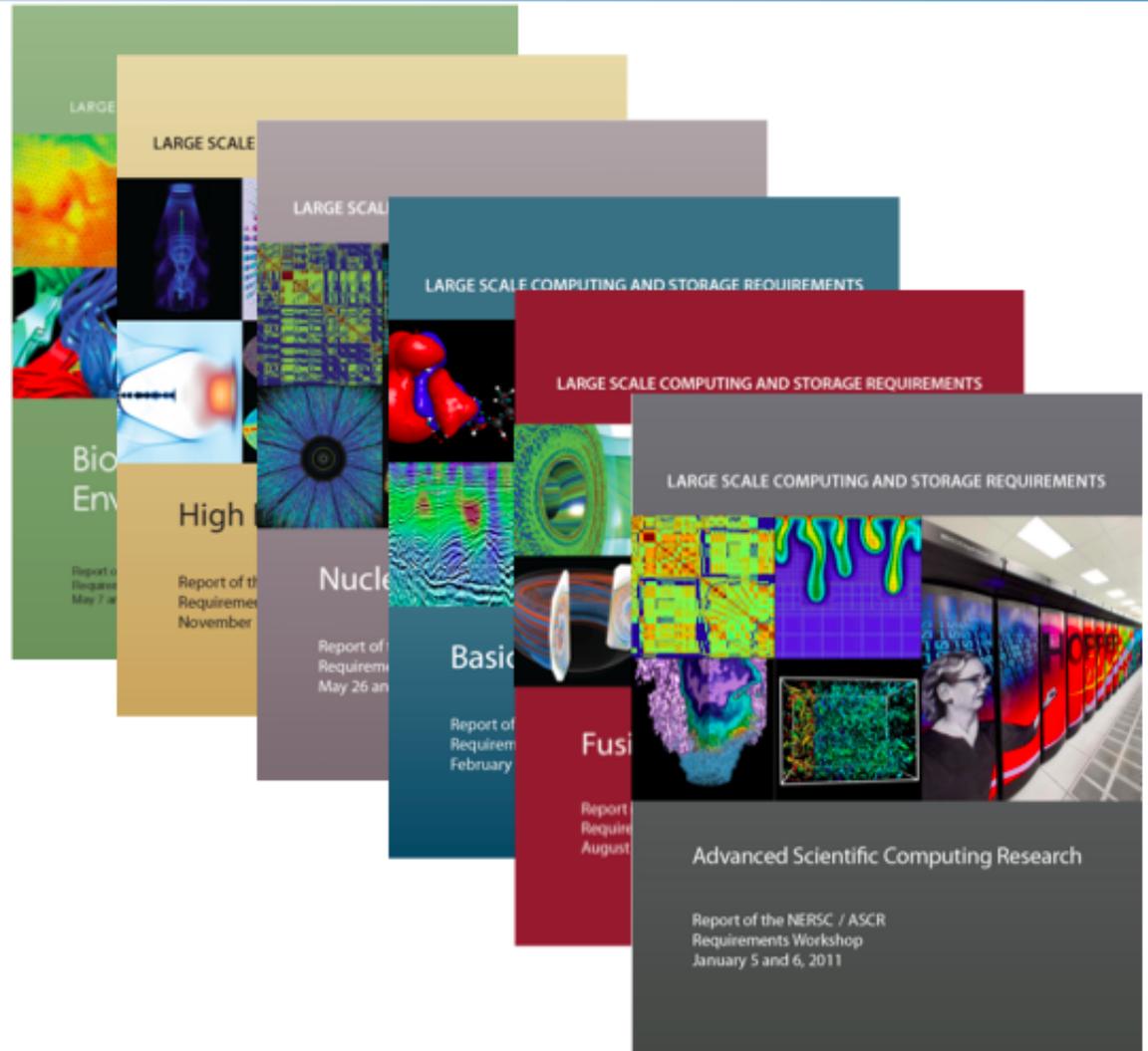


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User Requirements for NERSC 7

Largely based on a series of NERSC workshops.





User Requirements Workshops

- **Goal:** Ensure that NERSC continues to provide the world-class facilities and services needed to support DOE Office of Science Research
- **Method:** Workshops to derive and document each DOE SC Office's HPC requirements for NERSC in 2013-14
- **Deliverables:** Reports that includes both the **HPC requirements** and supporting narratives, illustrated by specific science-based case studies
- **Use:** **Guide NERSC procurements** and service offerings; help NERSC, ASCR, Program Offices advocate for the HPC resources needed to support DOE science goals



Schedule



BER
May 7-8, 2009
Report Published



FES
Aug. 3-4, 2010
Report Published



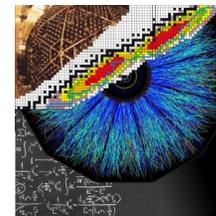
HEP
Nov. 12-13, 2009
Report Published



ASCR
Jan. 5-6, 2011
Report Published



BES
Feb. 9-10, 2010
Report Published



NP
May 26-27, 2011
Final Draft Review



High-Level Results

- ✓ Total hours needed at NERSC in 2014
- ✓ Hours needed by each Office of Science program office in 2013 or 2014
- ✓ List of primary findings for each office



Total Hours Needed in 2014

15.6 Billion

> 10X 2011 Usage



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Methodology

- **Gather requirements for 2013/2014 from top projects at NERSC in each office**

$$\text{Pct} = (\sum \text{represented project's hrs}) / (\text{office hrs used})$$

$$\text{Office requirement} = (\sum \text{represented needs}) / \text{Pct}$$

$$\text{Total requirements} = \sum \text{Office requirements}$$

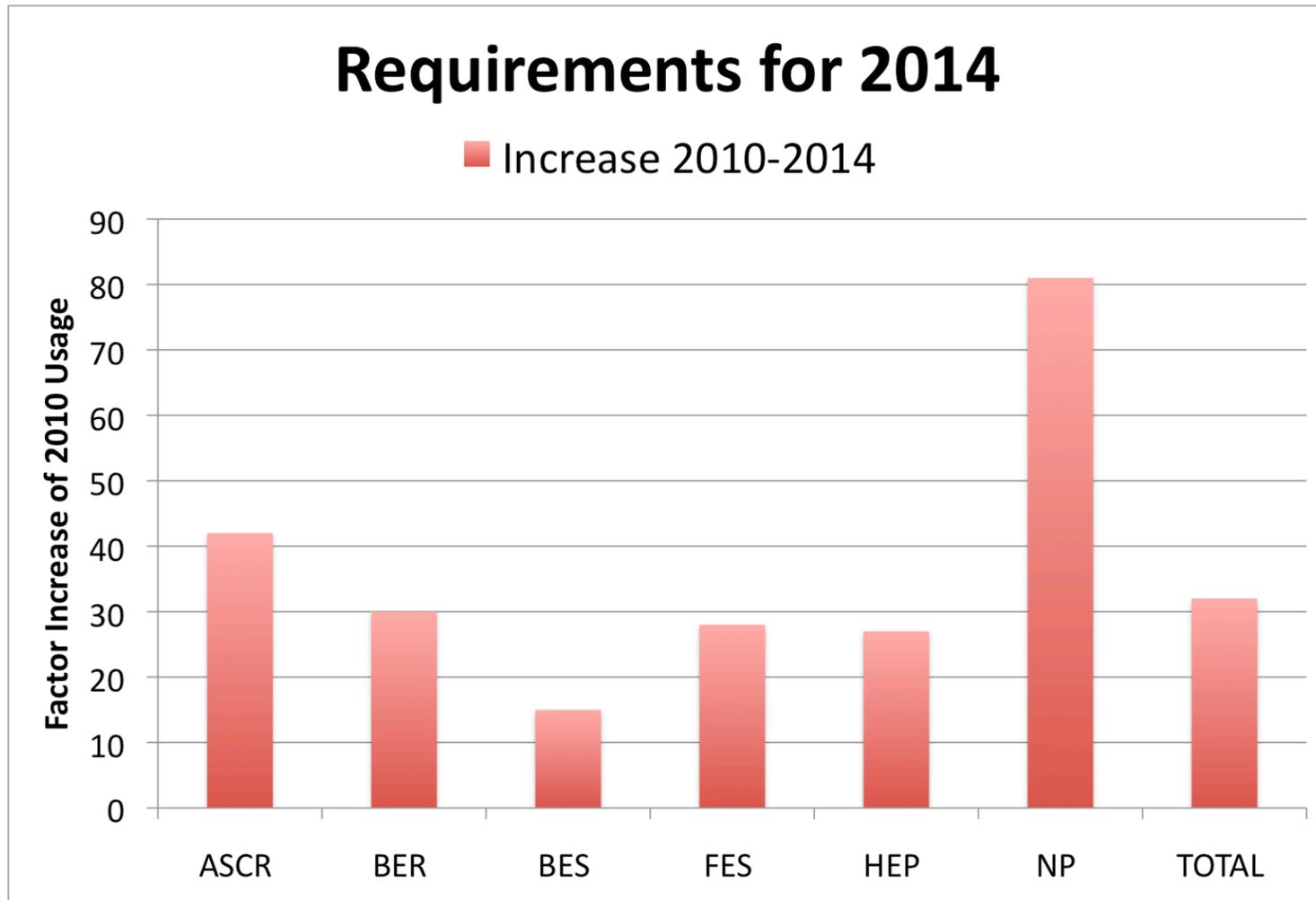


Office Summary

Office	Hours Needed in 2014	Increase 2010-2014
ASCR	1.1 B	42 X
BER	2.3 B	30 X
BES	3.0 B	21 X
FES	1.9 B	28 X
HEP	2.4 B	27 X
NP	4.9 B	81 X
TOTAL	15.6 B	34 X

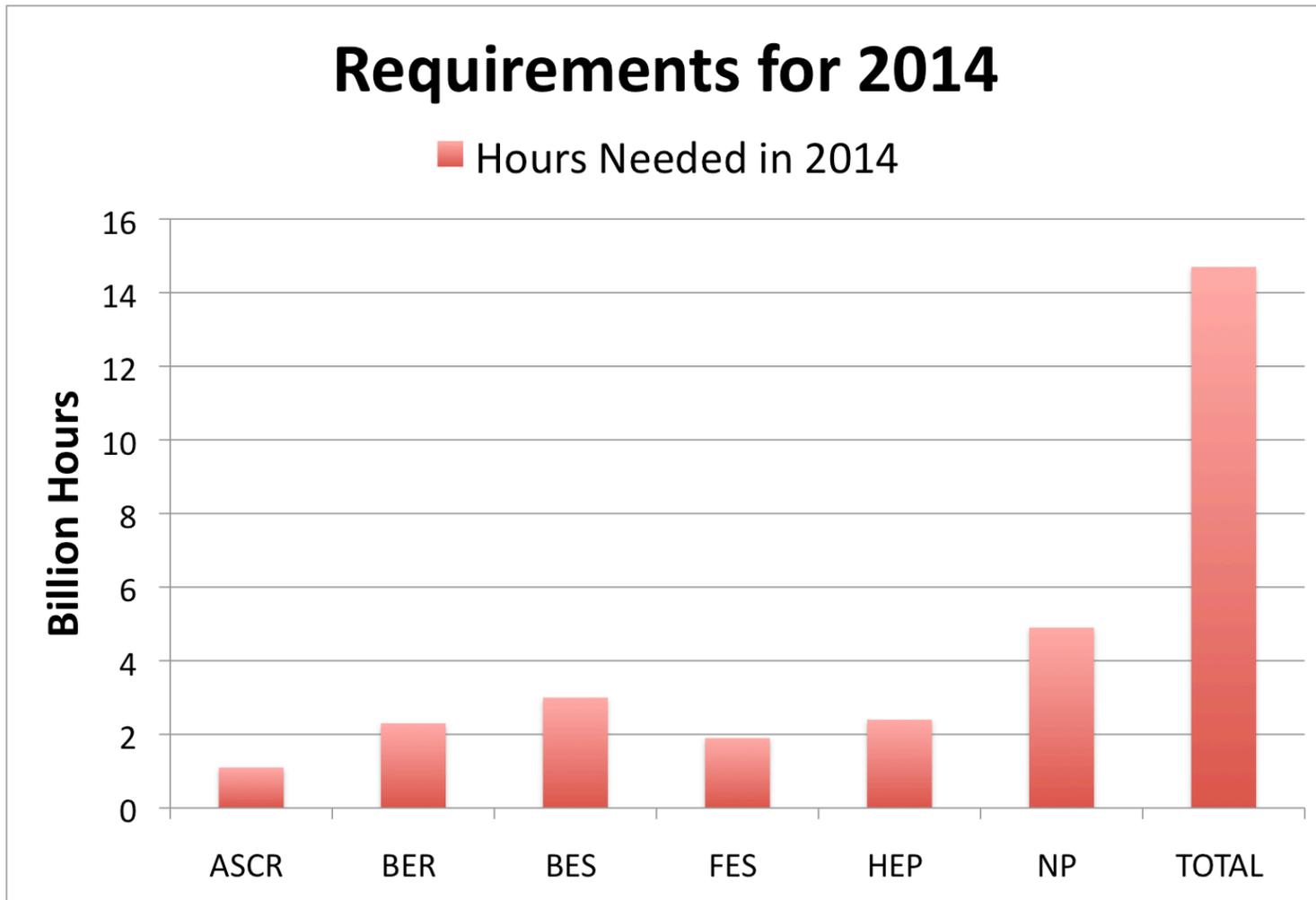


Requirements for 2014



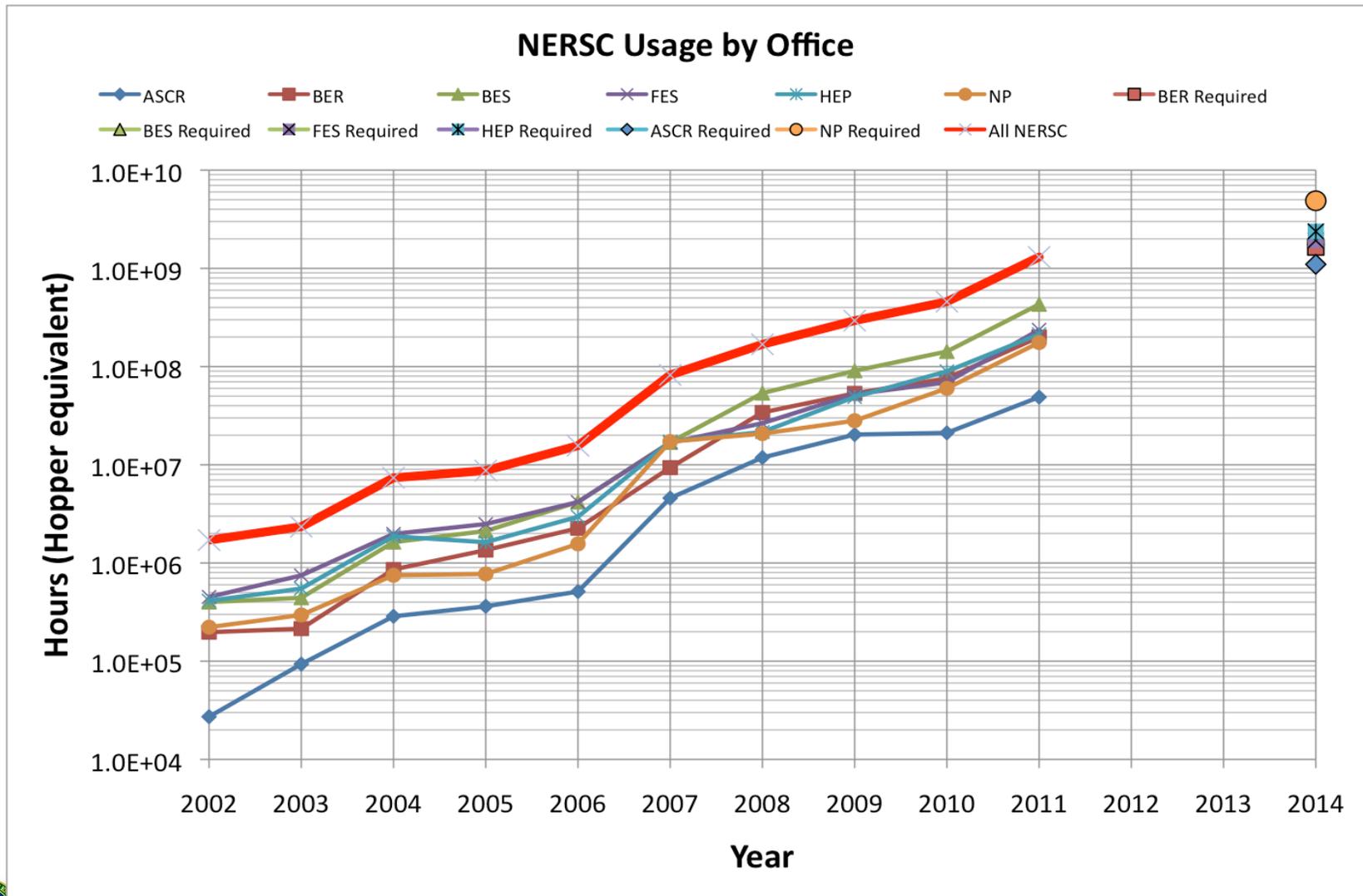


Requirements for 2014



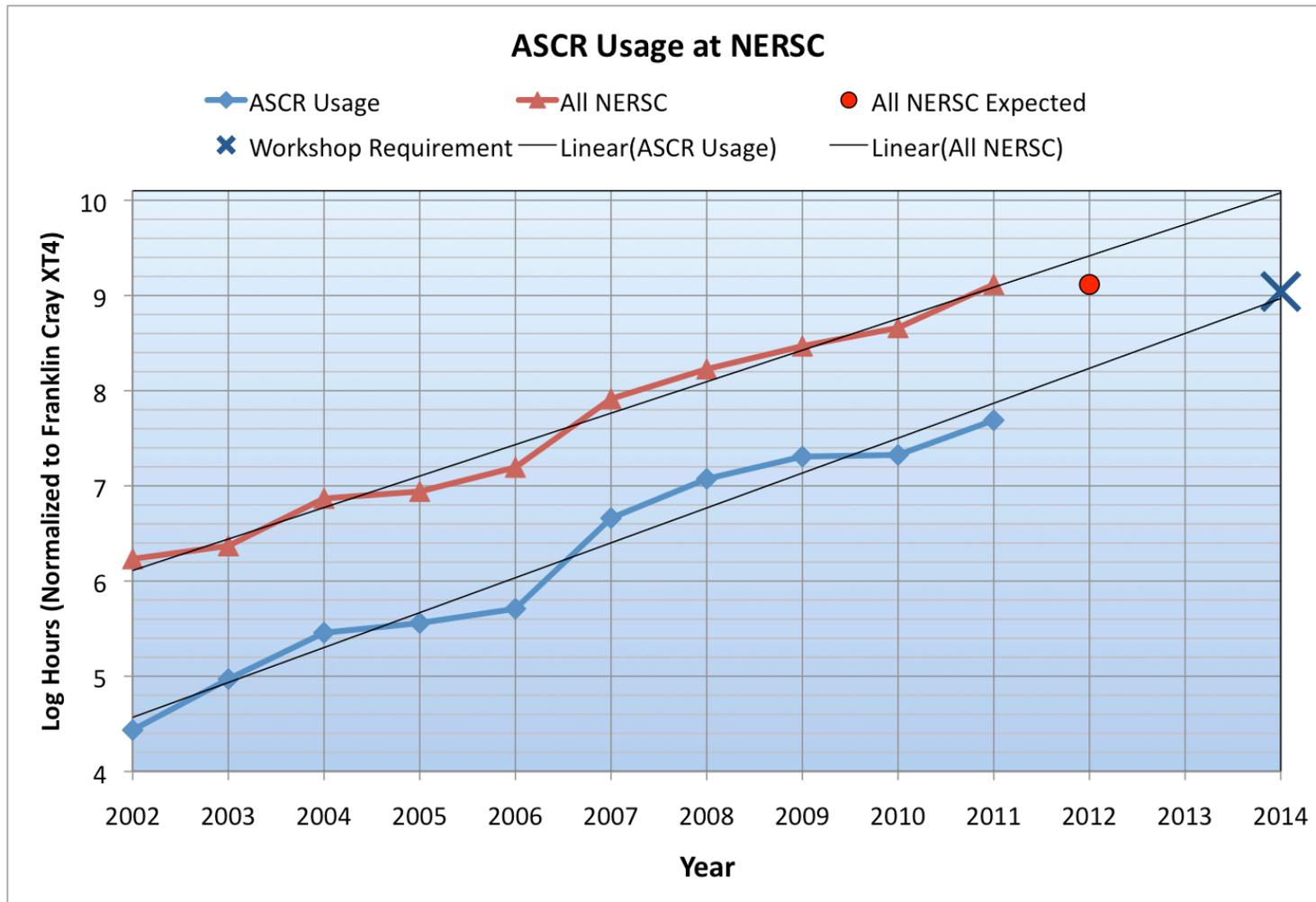


Historical Trend



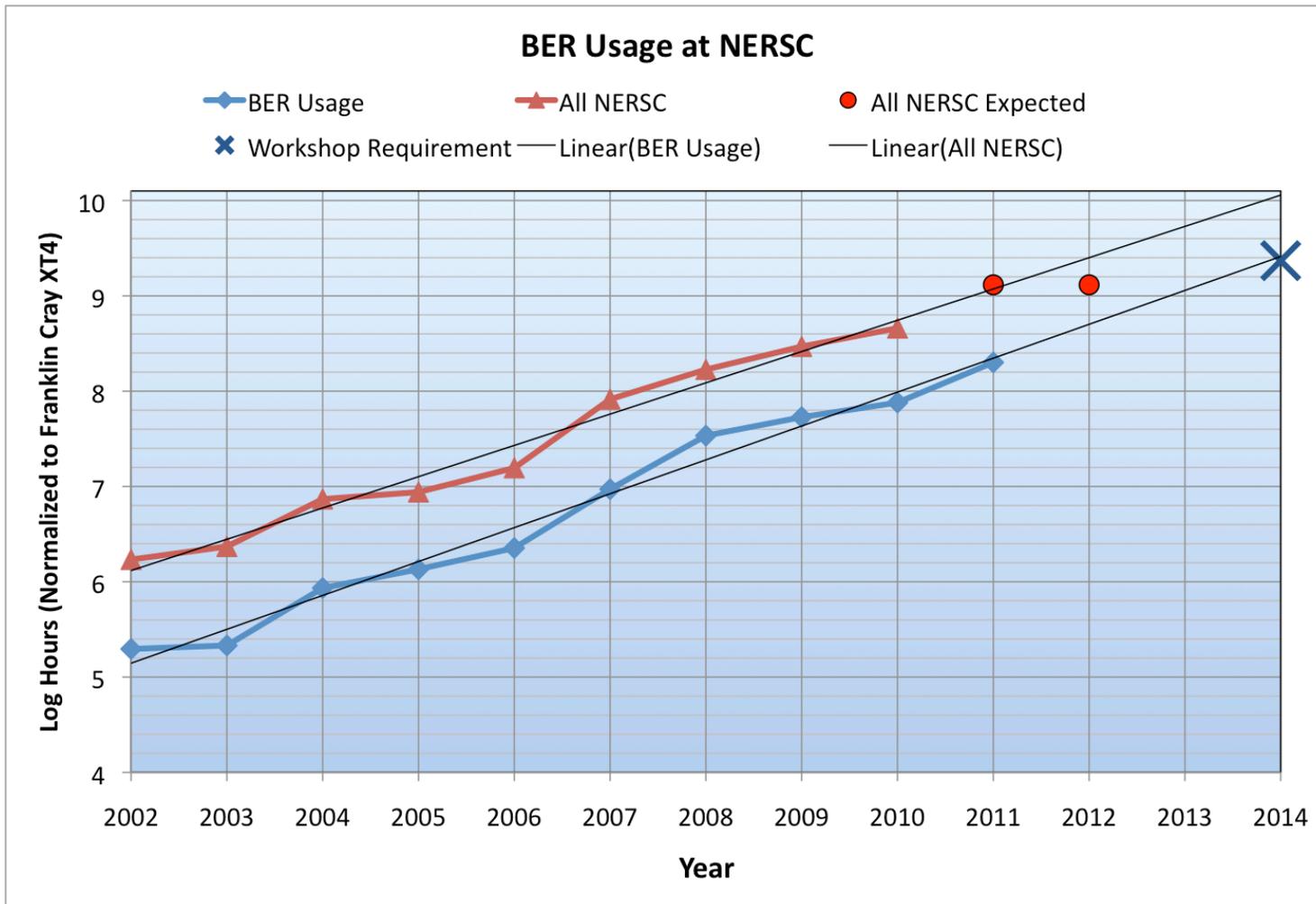


Advanced Scientific Computing Research



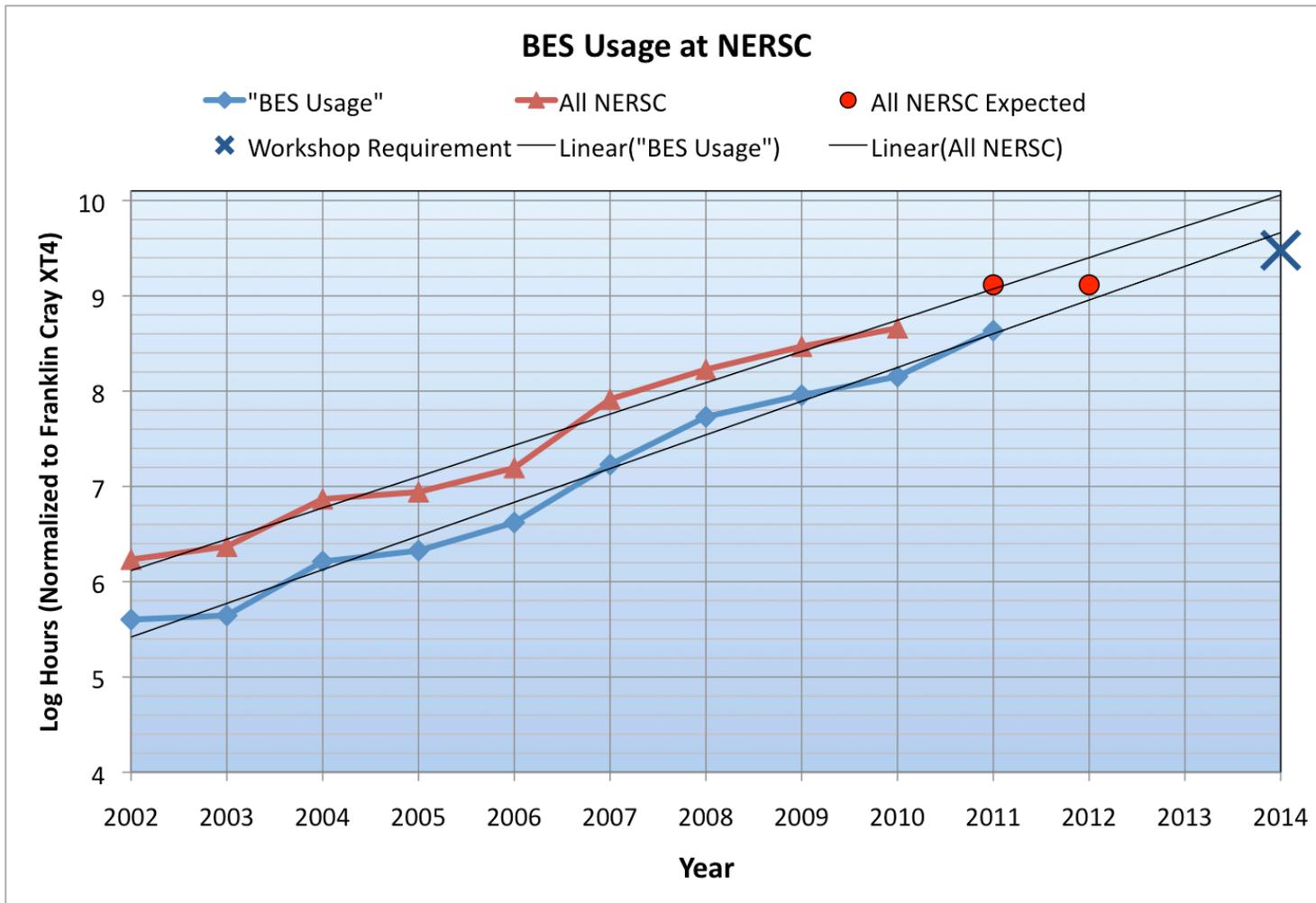


Biological and Environmental Research



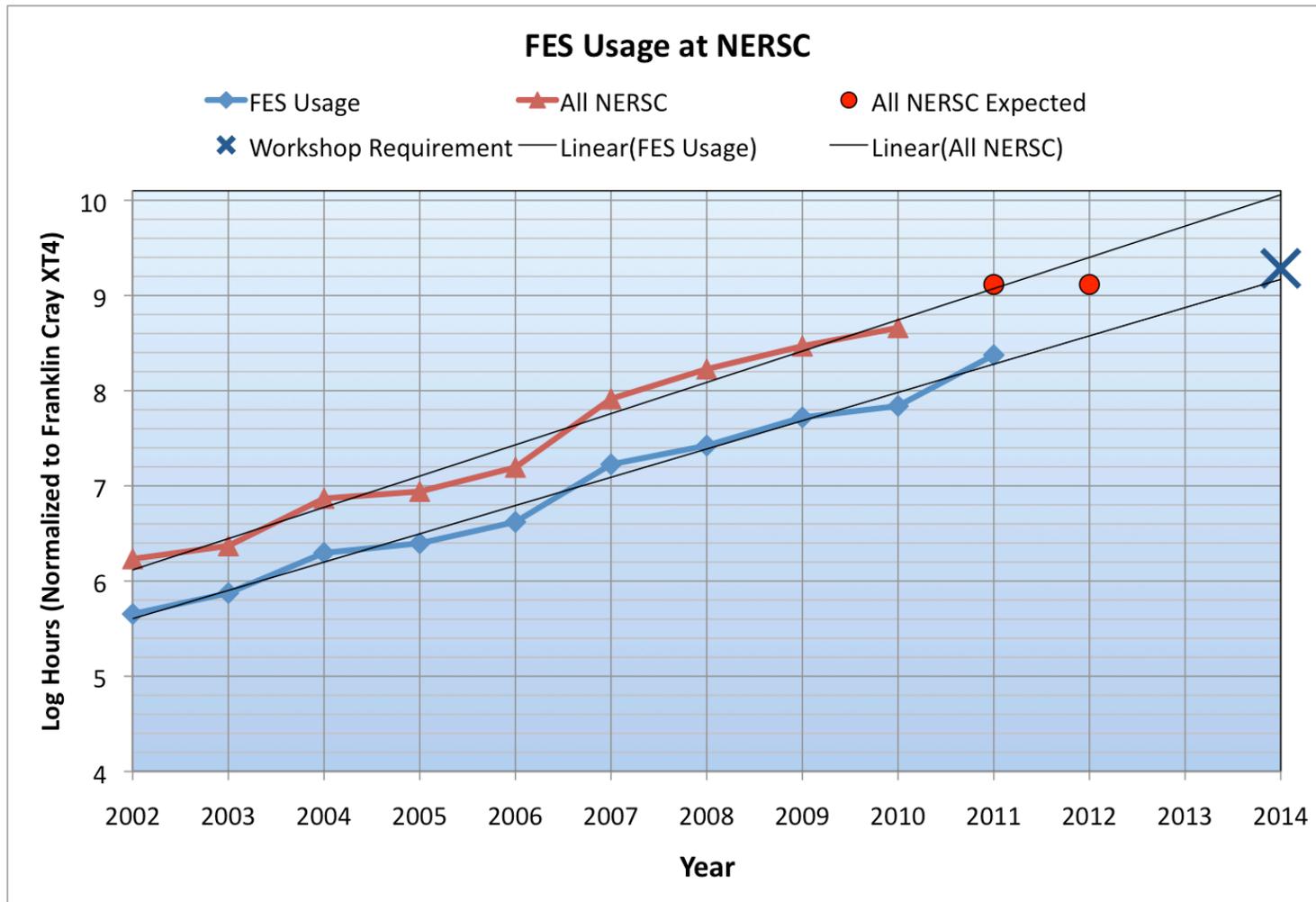


Basic Energy Sciences



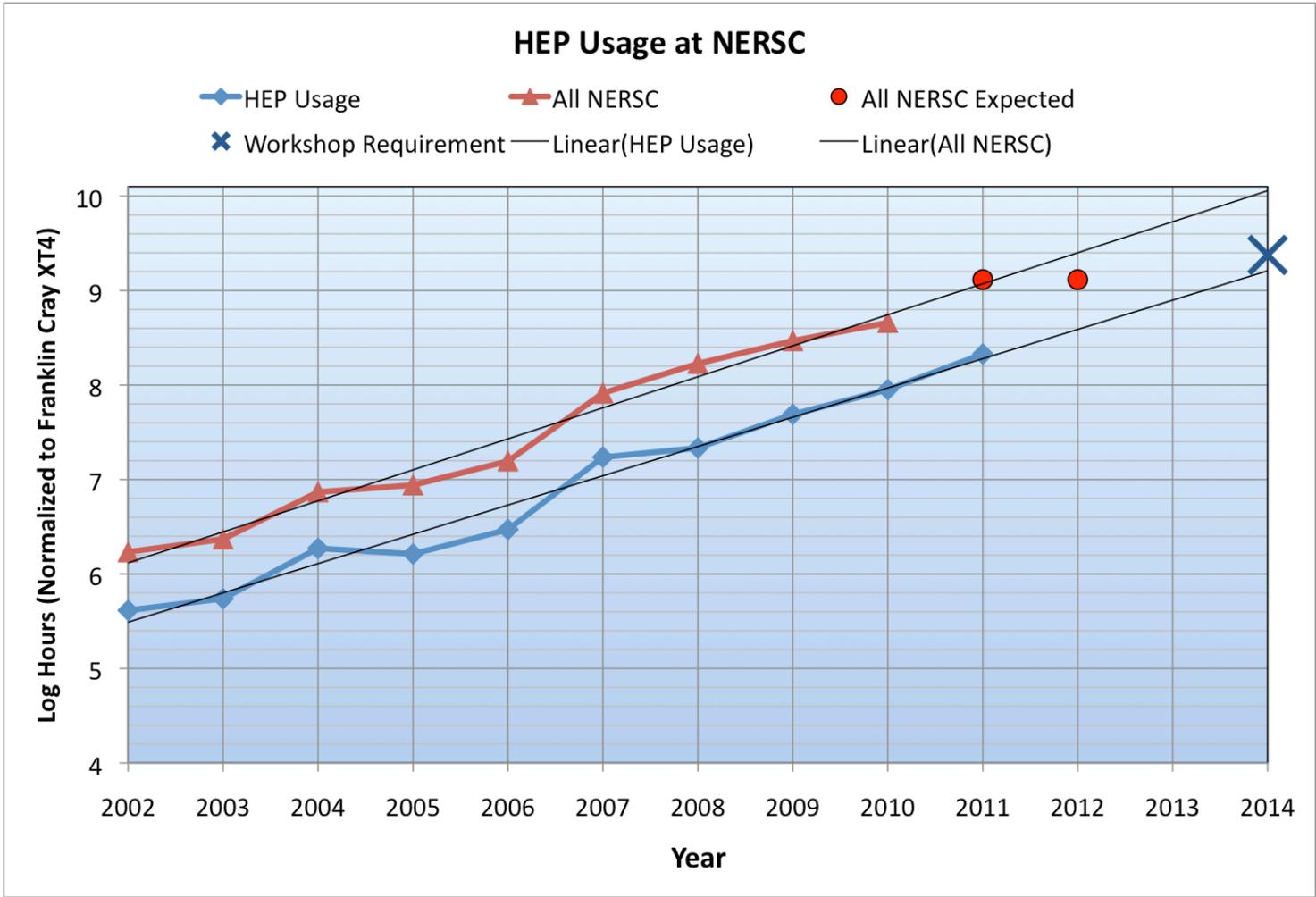


Fusion Energy Science



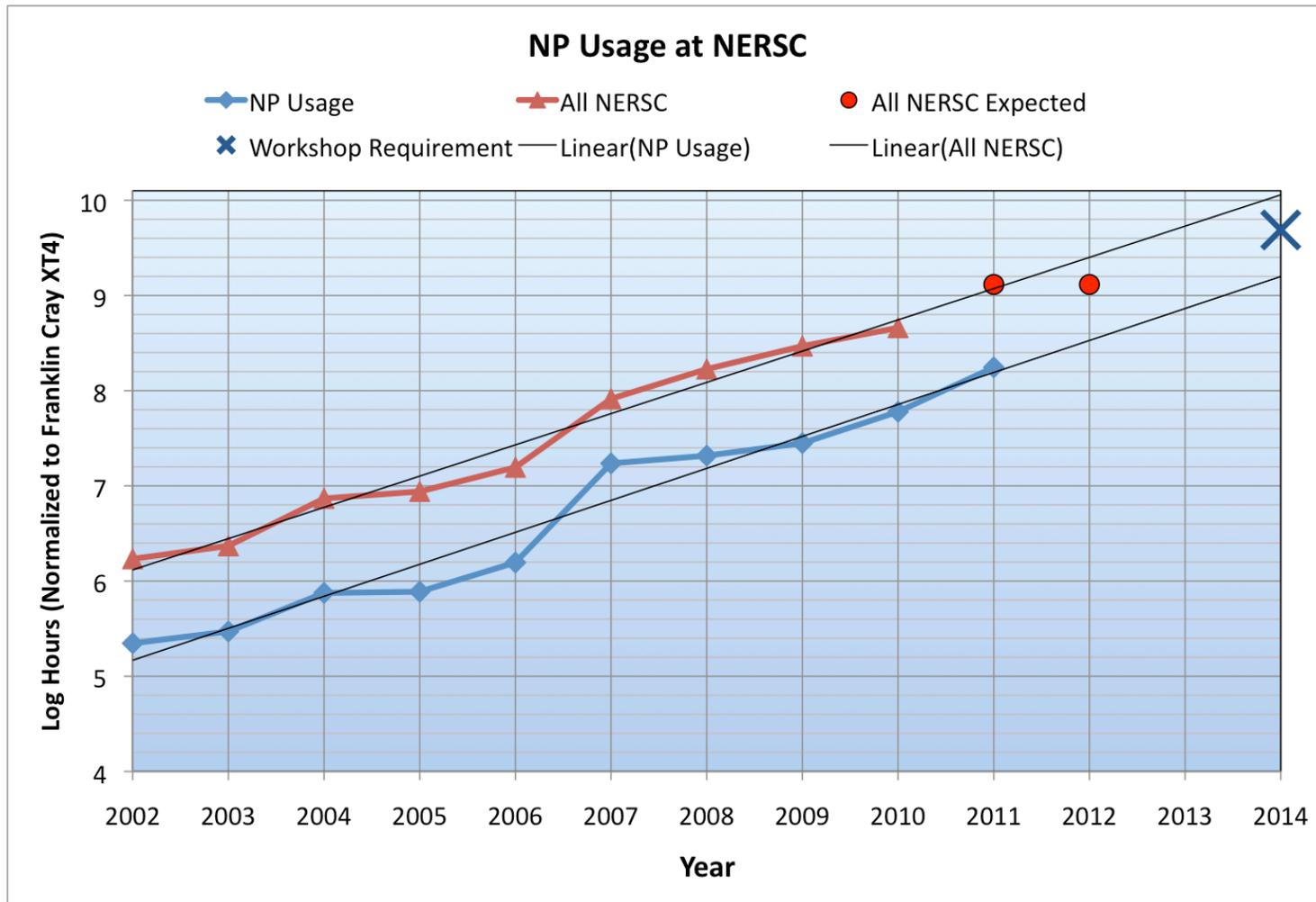


High Energy Physics





Nuclear Physics





Services & Features

- **Workshops not just about numbers**
 - What services do you need?
 - What software?
 - Workflows?
 - New capabilities required?
 - What training?
 - Access & security?
 - Sharing?
 - **What do you need to be successful in your research?**



Findings Summary

	ASCR	BER	BES	FES	HEP	NP
More Allocation	X	X	X	X	X	X
Support Big Data	X	X	(X)	X	X	X
Support High Throughput Workflows; Ensemble Runs	X	X	X	X	X	
Rapid, Predictable Turnaround		X	X		X	
Help Prepare for Future Architectures		X	X		X	
Highly Available, Stable Systems		X		X	X	
Support Standard Apps, Libs, Tools	X		X	X		



Desired Criteria for Next System

(Based on User Requirements WS)

- **A significant increase in total computational throughput.**
- **Effective application performance for the diverse workloads of the DOE science community.**
- **Good ease of adoption and usage by existing users and projects.**
- **Support for production software applications, libraries, and tools.**
- **Adequate data storage and I/O to support needs of entire workload.**
- **Solid reliability and stability.**



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